

Name:	
Enrolment No:	

UPES End Semester Examination, May 2024						
<table style="width: 100%;"> <tr> <td style="width: 60%;">Course: Introduction to Aerospace Engineering</td> <td style="width: 40%;">Semester: II</td> </tr> <tr> <td>Program: B.Tech ASE</td> <td>Time 03 hrs.</td> </tr> <tr> <td>Course Code: ASEG 1002</td> <td>Max. Marks: 100</td> </tr> </table>	Course: Introduction to Aerospace Engineering	Semester: II	Program: B.Tech ASE	Time 03 hrs.	Course Code: ASEG 1002	Max. Marks: 100
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SECTION A

S. No.		Marks	CO
Q1.	Classify Aerodyne in various categories and explain each type of aircraft in brief.	4	CO1
Q2.	A pitot tube mounted on an aircraft flying at 40,000 ft provides a pressure value of 39 kPa. Calculate the velocity of the aircraft. Assume atmospheric pressure and air density at 35,000 ft is 18.8 kPa and 0.9 kg/m ³ respectively.	4	CO2
Q3.	Compare characteristic curve (CL Vs α) and stalling angle of attack for an airfoil and a wing having same airfoil shape.	4	CO2
Q4.	List various basic instruments of an aircraft.	4	CO3
Q5.	List various chemicals used in manufacturing of solid rocket propellant.	4	CO4

SECTION B

Q6.	Highlight major contribution of Wright Brothers toward the development of Aeronautical engineering.	10	CO1
Q7	An airfoil is tested in the wind tunnel under standard sea level conditions at freestream velocity of 40m/s and an angle of attack of 8 ⁰ . The force balance read the value of normal force and axial force experienced by the airfoil as 800N and 75N respectively. Calculate the coefficient of lift, coefficient of drag and aerodynamic efficiency of the airfoil. Assume the planform area to be 0.7 m ² .	10	CO2
Q8	Discuss various construction methods of an aircraft's fuselage. Elaborate on various structural components and their roles. <p style="text-align: center;">OR</p> Discuss various materials used in modern day aircraft and justify their selection.	10	CO3
Q9	i. Differentiate liquid and cryogenic propellants. ii. Differentiate chemical with electrical rocket propulsion system.	10	CO4

SECTION-C

Q 10	i. Divide the flow regime based on Mach number. Discuss the flow characteristics of each regime in detail. ii. Classify the aircraft wing based on the following criteria: a. Planform shape b. Location of wing	10+10	CO2
Q 11	Explain various parts and working of a Ramjet engine with the help of a schematic diagram. Compare the ramjet engine with turbojet engine. <p style="text-align: center;">OR</p> Explain various parts and working of a Solid Propellant rocket engine with the help of a schematic diagram. Discuss the advantages and disadvantages of solid rocket propulsion over liquid rocket propulsion.	20	CO4